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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/899,093	07/06/2001	Michael O. Thompson	3672-0121P	2736

2292 7590 07/14/2003

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EXAMINER

HUR, JUNG H

ART UNIT	PAPER NUMBER
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2824

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/899,093

Applicant(s)

THOMPSON ET AL.

Examiner

Jung (John) Hur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003 and 25 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-18 is/are allowed.
- 6) ☒ Claim(s) 1,2,6-14 and 19 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 12 May 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 25
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Amendment

1. Acknowledgment is made of applicant's Amendments, filed 12 May 2003 and 25 June 2003. The changes and remarks disclosed therein were considered.

Claim 19 has been added and claim 3 has been cancelled; therefore, claims 1-2 and 4-19 are pending in the application.

Interviews

2. Acknowledgment is made of the personal interview conducted with Mr. Chad Billings on 03 June 2003 and subsequent phone interviews prior to the filing of the supplemental amendment on 25 June 2003. See attached interview summary for details of the subsequent phone interviews.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Norway on 07 July 2000.

However, it is noted that applicant has not filed a certified copy of the 20003508 application as required by 35 U.S.C. 119(b).

Drawings

4. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 12 May 2003 have been approved. A proper drawing correction or corrected drawings are

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required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Specification

5. The substitute specification, filed 12 May 2003, has been entered.
6. Claim 19 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Specifically, claim 19 recites a limitation " $\delta 1 = \delta 2 = 0$ corresponds to read/write protocols with maximum $V_{s/3}$ voltage exposure on non-addressable cells" which is recited in parent claim 9, and, therefore, fails to further limit claim 9.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 2 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuroda (U.S. Pat. No. 5,550,770).

Regarding claims 1 and 2, Kuroda discloses, in Figs. 1-15 and respective portions of the specification, a memory array of cells comprising ferroelectric capacitors and a method of driving said memory array of cells, wherein all word lines and bit lines (data lines, in the reference) are controlled with a plurality of pre-defined potential levels in a predetermined, time-coordinated sequence. Kuroda further discloses read, refresh (rewrite, in the reference) and write cycles in the predetermined, time-coordinated sequence; during the read cycle, potential on a selected bit line floats in response to flowing charges when the charges are sensed (Fig. 15), and during the write or refresh cycle, the word line and bit line potentials are latched to said sequence of potentials (Figs. 12-14). Further, Kuroda in Figs. 2-8 discloses a matrix of ferroelectric cells on a single array layer (one block of cells) wherein all memory locations (for example, C0) are accessed solely by each cell's bit line (for example, d0 for C0) and word line (for example, W00 for C0), such that the cells (C0-C7 and others in the figures), word lines (W00-W07), and bit lines (d0-d7) comprise a passive matrix. Further, Kuroda, for example, in Fig. 2, discloses that the word and bit lines include a first crossline voltage potential (for example, $+V_o/2$ on C1) between an unselected bit line and a selected word line, a second crossline voltage potential (for example, $+V_o/2$ on the cell below C0) between a selected bit line and an unselected word line, and a third crossline voltage potential (for example, zero potential on the cell below C1) between an unselected bit line and an unselected word line, the sum of the first, second and third crossline voltage potentials (i.e., the sum of the potentials, $+V_o/2$, $+V_o/2$ and 0, discussed above) being less than or substantially equal to V_s during read/write cycles, where V_s (V_o , in the reference) is the voltage across an addressed cell (for example, C0) during read, refresh, and write cycles.

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Regarding claims 11-14, Kuroda discloses same quiescent potentials on all the word lines and bit lines (data lines, in the reference), namely, $V_0/2$ in Figs. 9 and 10, and 0 V in Figs. 12-15, where $V_0/2$ is same as the potential on unselected word lines and bit lines, and 0 V represents system ground (Figs. 2-8). In Fig. 10(C), Kuroda further discloses a precharge period where the potential on a selected bit line is changed from a quiescent potential before a floating period in which the flowing charge is sensed (precharge of data line and sense steps, in the reference). In Fig. 15, Kuroda further discloses a precharge pulse on unselected word lines as an option, such that said precharge pulse terminates when the potential on a selected bit line changes for a read cycle. With the precharge pulse, the voltage across unselected cells on the selected bit line would be about $V_0/2$ from the onset of the precharge pulse until the read cycle is completed.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6-10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda (U.S. Pat. No. 5,550,770) in view of Tannas (U.S. Pat. No. 4,169,258) or Anderson (U.S. Pat. No. 3,002,182).

Regarding claims 6-10 and 19, Kuroda discloses a method of driving a ferroelectric memory array as in claim 1 (see above). Kuroda further discloses that the voltage across unselected cells is about half of applied voltage across a selected cell (see, for example, column

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2, lines 2-6), and unselected lines are fed with about one half of the select voltage (see, for example, column 2, lines 17-20), implying that the operating voltage may deviate from exact half value. However, Kuroda does not disclose details of these voltage deviations. Tannas discloses that potentials on word lines (x-lines, in the reference) and bit lines (y-lines, in the reference) may shift either negatively or positively (see, for example, column 8, lines 65-67). Anderson discloses ranges of potentials for word and bit lines from which the operating potentials are selected (see, for example, column 7, line 75 through column 8, line 35).

Therefore, in view of Kuroda, Tanns and Anderson, it would have been obvious to one having ordinary skill in the art at the time the invention was made to increase the voltage across unselected cells along a selected word line by a controlled voltage and to decrease the voltage across unselected cells along a selected bit line by the same controlled voltage, or to increase the potential of unselected word lines by a controlled voltage and to decrease the potential of unselected bit lines by the same controlled voltage, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a result effective variable involves only routing skill in the art. *In re Aller*, 105 USPQ 233.

Allowable Subject Matter

11. Claims 15-18 are allowed.
12. Claims 4 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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13. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 4 and 5, the prior arts of record do not disclose or suggest a method wherein voltages across non-addressed cells do not significantly exceed $V_s/3$ (where V_s is the voltage across an addressed cell) during read, refresh and write cycles.

Regarding claim 15, the reasons for the indication of allowable subject matter are on record in the file.

Regarding claim 17, the prior arts of record do not disclose or suggest a method wherein a timing sequence (of voltage levels applied to word lines and bit lines) results in unselected cells having a crossline voltage potential $\leq V_s/3$ during read/write cycles.

Response to Arguments

14. Applicant's arguments with respect to claims 1 and 17, filed 12 May 2003, starting at the bottom of page 10 through page 12, have been considered, but are moot for claim 1 in view of further changes to claim 1 included in the supplemental amendment, filed 25 June 2003.

Specifically, claim 1 as amended in the supplemental amendment of 25 June 2003 no longer includes the limitation "the timing sequence results in unselected bit lines and word lines having an average crossline voltage potential $\leq V_s/3$ " which is the substance of the arguments.

However, for claim 17, the arguments are persuasive, and therefore, the 102 rejection of claim 17 has been withdrawn. See the above reason for indicating allowance of this claim.

15. Applicant's arguments with respect to claims 4 and 5, filed 12 May 2003, in the middle of page 14, have been considered but are not persuasive. However, after further considerations

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of the references, Tannas and Anderson, the 103 rejections of claims 4 and 5 have been withdrawn. See the above reason for indicating allowance of these claims.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung (John) Hur whose telephone number is (703) 308-1624.

The examiner can normally be reached on M-Th 6:00 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (703) 308-2816. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jhh
July 9, 2003

A handwritten signature in black ink, appearing to be 'Richard Elms', with a stylized, flowing script.

**RICHARD ELMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800**